with Access before exporting to eQUEST. In this manner, Atelier Ten is empowered to update energy model inputs upstream of the Revit model, and these changes will become readily apparent to KieranTimberlake as it performs itemized synchronization prior to generating a new energy model with updated building geometry.

RESULTS AND DISCUSSION

Efficiency Gains and Quality Assurance

The efficiency gains set as targets for the design team include savings in data entry time and model iteration time, and agility in answering specific design questions. One benefit of the designed software workflow is that model geometry and space types automatically update themselves within Revit, reducing the amount of time that needed to bring the energy model up to the current design. In a recent test, the Custom Application took under 30 seconds to parse a Revit model containing 201 Areas and generate a new INP file containing over 20,000 lines of code.

In contrast to typical energy modeling practice in which most inputs reside solely within the energy model, the workflows presented here allow multiple parties to participate the creation and review of energy model inputs. This holds intrinsic value from a quality assurance standpoint and reduces dependence on end-of-phase reports to coordinate and review energy model assumptions.

Furthermore, placing energy model content in a Revit model provides a means of reviewing analysis results in a spatially explicit context. For example, Area or Room parameters may be used to generate a series of floor plans that are color-coded to represent any desired energy model inputs, such as lighting power density or activity code (Figure 3).

Current Development

Several aspects of the present workflow have been designed to anticipate ongoing feature development. As mentioned previously, tracking Room-Area relationships will allow for increased spatial resolution of the energy model as the Revit model content continues to develop. The design of the side-by-side interface, which decouples the natural model hierarchy from the particular sequence and syntax of the eQUEST input definition, anticipates extension of this work to other energy model exchange formats such as the input data file (IDF) format for EnergyPlus. Additionally, the consistent nomenclature assured by this workflow provides a natural framework for incorporating energy model results back into the Revit model to aid in spatially explicit inspection by the design team. Efforts are presently underway in developing a web-based viewer that will combine BIM and energy model content to permit a more interactive visualization of analysis results. This tool will allow loads and system responses to be viewed across space and time domains, thereby highlighting opportunities for passive design and load-sharing strategies. It is anticipated that an exercise in visualizing energy performance will elevate the design team's collective understanding and solidify the development of this project as a rich ecosystem of relationships.

CONCLUSION

While still under development, the interactive modeling workflows presented here demonstrate value in a seamless integration of building geometry and collectively authored energy model parameters in service of a more efficient iterative energy modeling practice. By placing architects in closer dialog with the inputs and results of energy models, this work has the potential to elevate energy model literacy among non-experts.

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